

## Diversified quality production revisited: the transformation of production systems and regulatory regimes in Germany

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Sorge, Arndt; Streeck, Wolfgang

**Working Paper**

## Diversified quality production revisited the transformation of production systems and regulatory regimes in Germany

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MPIfG Discussion Paper 16/13

**Diversified Quality Production Revisited**

The Transformation of Production Systems and  
Regulatory Regimes in Germany

Arndt Sorge and Wolfgang Streeck



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## Abstract

We revisit the concept of Diversified Quality Production (DQP), which we introduced about thirty years ago. Our purpose is to examine the extent to which the concept can still be considered tenable for describing and explaining the development of the interaction between the political economy and concepts of production, notably in Germany. First, we show why and in which ways DQP was more heterogeneous than we had originally understood. Then, on the basis of evidence with respect to political, business, and economic changes in Germany, we show that DQP Mark I, a regime by and large characteristic of the 1980s, turned into DQP Mark II. In the process, major “complementarities” disappeared between the late 1980s and now – mainly the complementarity between production modes on the one hand and industrial relations and economic regulation on the other. While the latter exhibit greater change, business strategies and production organization show more continuity, which helps explain how Germany maintained economic performance after the mid-2000s, more than other countries in Europe. Conceptually, our most important result is that the complementarities emphasized in political economy are historically relative and limited, so that they should not be postulated as stable configurations.

**Keywords:** production concepts, manufacturing, diversified quality production, industrial organization, industrial relations, industrial restructuring, globalization, skills, Germany

## Zusammenfassung

Dies ist eine Neubetrachtung des Konzepts der Differenzierten Qualitätsproduktion (DQP), das vor etwa dreißig Jahren von uns eingeführt wurde. Wir prüfen, inwieweit das Konzept noch zur Beschreibung und Erklärung der Wechselwirkung zwischen politischer Ökonomie und Produktionskonzepten taugt, vor allem in Deutschland. Zuerst zeigen wir, dass DQP vielgestaltiger war, als wir uns dies zunächst vorgestellt hatten. Danach diskutieren wir vor dem Hintergrund des politischen sowie betriebs- und volkswirtschaftlichen Wandels in Deutschland, wie DQP Mark I, ein vor allem in den 1980er-Jahren vorherrschendes Regime, zu DQP Mark II wurde. Dabei verschwanden zentrale „Komplementaritäten“, insbesondere die zwischen Produktionsweisen einerseits und Arbeitsbeziehungen und wirtschaftlicher Regulierung andererseits. Während die letzteren mehr Veränderung aufwiesen, zeigten Geschäftsstrategien und Produktionsorganisation mehr Kontinuität. Dadurch erklärt sich die im Vergleich zu anderen europäischen Ländern stabile deutsche Wirtschaftsleistung nach 2005. In konzeptioneller Hinsicht ist unser wichtigstes Ergebnis, dass die in der politischen Ökonomie betonten Komplementaritäten historisch relativ und zeitlich begrenzt sind; sie sollten deshalb nicht als stabile Konfigurationen vorausgesetzt werden.

**Schlagwörter:** Produktionskonzepte, industrielle Fertigung, diversifizierte Qualitätsproduktion, Industrieökonomik, Arbeitsbeziehungen, Strukturwandel, Globalisierung, Qualifikationen, Deutschland

**Contents**

1	Introduction	1
2	DQP defined	3
3	DQP as a diverse and changing production concept	5
4	The politics of DQP	9
5	Adaptive processes in the twentieth century and beyond	12
6	Summary and conclusion	15
	References	18

# Diversified Quality Production Revisited: The Transformation of Production Systems and Regulatory Regimes in Germany

## 1 Introduction

About thirty years ago, we introduced the concept of Diversified Quality Production (DQP) to describe a path of industrial development, or restructuring, different from and superior to Taylorist and Fordist mass production. We believed it to be superior in two ways. First, it was more adjusted to a changing economic environment, where market saturation required higher rates of product innovation and in which more customized products could catch a premium with customers as they came closer to increasingly differentiated product demands. Second, it was more responsive to pressures from a then-powerful organized workforce for high wages, stable employment, and a strong collective voice at the point of production. In short, we saw DQP as a business strategy, or business logic, that would make it possible for producers to sell at relatively high prices, enabling them to pay their workers relatively high wages. DQP producers would have the capacity to move into and conquer what used to be mass markets by dividing the large production runs of Fordist-era mass producers into smaller batches of customized products without giving up the advantages of large size and large volumes. Firms that were better at that strategy than others, we argued, would enjoy a competitive advantage in the overcrowded markets of the post-Fordist period. In our original publication (Sorge/Streeck 1988), we represented our conceptual structure using a fourfold table, crossing production volume (low, high) and product strategy (standardized price-competitive, customized quality-competitive; see Figure 1).

A central assumption was that for firms to move into and be successful in DQP, a number of external conditions needed to be given that were not trivial and were indeed improbable, at least in their combination, and which could not be created by firms acting individually and on their own. One such condition was the availability of a special kind of productive resources, the other the presence of a specific institutional and political context. By *productive resources*, we meant a flexible technology allowing for fast switching to non-routine production, a tradition of quality engineering, and a specific kind of manpower or human resources, including skilled apprenticed workers, engineers, and managers used to operating close to the point of production. Concerning the *institutional context*, we posited both facilitating and constraining conditions. Of central significance was an encompassing occupational training system for manual workers, enabling them to handle flexible technology and less routinized production processes. Such a system offered firms opportunities for experimenting with DQP, in particular if it provided for an excess supply of skills – which was more likely if it entailed institutionalized pressures on firms to train workers above and beyond their current needs.

Figure 1 A simple classification of product strategies

	<i>Standardized price-competitive products</i>	<i>Customized quality-competitive products</i>
Low volume	Specialized component production	Craft production
High volume	Mass production ("Fordism")	Diversified quality production

Source: Sorge/Streeck (1988: 30).

There were more constraints in the model. These included an industrial relations system that made for high wages and employment security; for a strong voice of workers at the point of production, making dismissals difficult and employment rigid; and for relatively egalitarian wage setting, rewarding employer investment in training across the wage scale. The idea was that this would force employers to invent profitable production regimes and production concepts capable of supporting an expensive and formally rigid labor regime, limiting external flexibility but promoting internal flexibility. As the institutions required for this can be effective only if they are politically and legally backed, they are most likely to exist at the level of a nation-state. As a result, DQP was associated with national economies, or national "models" of capitalism and political economy. It was above all the "German system" of the time that had inspired the concept, as it seemed best suited to explaining the peculiar economic success of Germany in the post-Fordist restructuring period of the 1980s.

The DQP concept, we believe, was innovative in three ways. First, while the interaction between firms and their business logics and production models on the one hand and their societal context on the other had been studied before, DQP politicizes the "societal effect" (Maurice/Sorge 2000) by emphasizing power relations as a major influence on business practices. Second, DQP implies a partial reversal of the line of causation which was prevalent in economics: from product markets to product strategies, production strategies, human resource policies at firm level, and the labor market. In contrast, DQP stipulates that labor market conditions, shaped by political and industrial relations institutions, can affect human resource policies, which may in turn modify production arrangements and product development and enable firms to affect demand by offering products that are both more attractive than mass products and adjusted to the conditions in the labor market. Third, DQP suggests that collective political constraints may be a productive force, by making firms adopt a demanding product strategy that they would perhaps not have adopted had they had a choice. The idea that constraints can be productive, or "beneficial" (Streeck 1997), because economic actors might choose sub-optimal strategies in their absence – preferring profitability over productivity – flies in the face of the liberal-voluntarist concept of economic action that has long dominated mainstream economics.



In our original formulation, we thus provided for an array of wider institutions enabling and cajoling actors to adopt a DQP strategy, making it the prevalent pattern in a national socio-economy – i.e., an economy as shaped by regulatory institutions and other social norms. We argued that Germany was an exemplary case of wider institutional conditions promoting DQP practices, including the respective technical and business logics. While our image of DQP in Germany was widely noted and often adopted,<sup>1</sup> legitimate questions were soon asked about how DQP had done under the impact of liberalization, internationalization, and financialization, and whether it still adequately captured the causes of German industrial performance after the turn of the century, and in particular after the global financial crisis of 2008.<sup>2</sup> We believe it is therefore high time for us to return to a concept that had some impact on the political economy and industrial sociology debate and review what happened to DQP in Germany since, in an effort to assess the historical strengths and limitations of the concept.

## 2 DQP defined

DQP was conceptualized in comparative studies about what were called “production systems,” which included development, planning, marketing, and other value-adding functions in the enterprise. In the debate that took place in the 1980s about the “effects” of “new technology,” Sorge et al. (1983) showed, for the application of computer numerically controlled (CNC) machine-tools in industrial processes, that how technical change worked out was a consequence of manufacturing policies and their embeddedness in socioeconomic institutions. Manufacturing policies depended mainly on two factors familiar from studies of organization and technology: the routineness<sup>3</sup> of operations and the size of establishments – increasing size being linked with greater bureaucratic control and greater division of labor between laterally or vertically segmented jobs or occupations. How new technology was used depended on its specific design and rationale under the influence of changing policies to respond to market changes, but was also very much influenced by socioeconomic settings. Routineness was measured by the typical batch size in an establishment – i.e., the number of identical pieces produced one after another in a production run. This turned the discussion of “effects” of technology upside down and focused attention on business policies and socioeconomic settings.

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1 See Whitley (1992) and later, various contributions by Richard Hall and David Soskice, as well as many others in comparative management, industrial relations, and political economy.

2 This was a major subject at a colloquium on the occasion of Wolfgang Streeck’s retirement from the directorship of the Max Planck Institute for the Study of Societies (MPIfG) on October 31, 2014. Contributions were made, among others, by Lucio Baccaro, Robert Boyer, Martin Höpner, and Gregory Jackson.

3 “Routineness” stands for the dimension “few exceptions versus many exceptions” as conceptualized by Perrow (1970: 83).

One of the operations and business logics defined by the dichotomized factors of batch size (routineness) and establishment (or plant) size was Diversified Quality Production. The idea was that, more than was often acknowledged in an age still marked by theories constructed during Fordism and Taylorism, large establishments could also implement non-routine value creation policies, and were increasingly doing so. “Diversification” of products and product pieces implied non-routineness, whereas “quality” referred to the fact that products were sold based on superior use value rooted in durability and reliability and in their closeness to the individual needs or tastes of customers, in their contribution to capital productivity on the part of buyers and users, or in any other intrinsic value of the product, including the symbolic and status-enhancing value of its brand. A change towards DQP was particularly evident in West Germany during the 1970s, more than in comparable countries; this explains why West Germany was able to weather the industrial crisis better than other large countries in Europe and North America.<sup>4</sup>

To us, it appeared that DQP was facilitated by long-running institutional conditions in a society at large. This argument was fully developed in Streeck (1991). The basic idea leading from an operations logic to an institutional logic was that DQP required the generation and provision of “redundant capacities” – a notion that followed from the theory of sociotechnical systems: diversification and customization of products and services for market segments attentive to quality and diversity, notably in more changeable task environments, needed a surplus of competencies because the uncertainty of existing and evolving demand rendered a precise prediction of the competencies needed impossible; providing competencies at a currently “required” level risked underinvestment in competencies and, therefore, operational rigidity (Trist 1981).

We saw redundant capacities as being provided by the following conditions, both enterprise-specific and at the level of societal institutions (see Streeck 1991: 37–42):

- Vocational education and training broadly based and at a high level, even and notably for relatively “lower” work skills;
- Organizational structures facilitating polyvalence, through overlapping and enriched work roles and functions, or departments, occupations, and jobs, based on the design principle of interpenetration rather than segmentation;
- Decentralization of authority and competence;
- Social peace between management and workers, as well as between sections of the work force.

Note that institutions supportive of DQP were not purely external to the enterprise but embraced both enterprise practice and “macro” regulation. The idea was that “West German institutional constraints and opportunities seem to form an interactive pattern

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4 Cox and Kriegbaum (1980) had shown that in the three main manufacturing industries, German companies moved to more customized non-routine production more forcefully than their British competitors and were therefore better able to maintain profit margins and employment.

of mutual reinforcement and causation ... a virtuous circle of upmarket restructuring” (Streeck 1991: 54). We had also conceived of this interactive pattern as one of “elective affinities” (*Wahlverwandtschaften*), such that institutions and practices – from product and work design policies in individual establishments up to macro-regulated norms and standards – would, over time, “find each other” and come to be associated by function and meaning.<sup>5</sup> The later political economy literature came to look at such elective affinities as “complementarities,” implying a functional coupling, such that a change on one dimension would (have to) cause a change in the others.

In the following sections, we first develop a critical analysis and discussion of the two major components of DQP – on the basis of work we did after the initial presentation of the idea – in two sections: one dedicated to DQP as a changing production concept, the other to its politics. We then analyze the adaptive processes that have taken place over time, leading to changes in the socioeconomic and political context of Germany as well as in DQP. In both respects, we ask what has disappeared, what has remained relatively stable, and what does this imply for the overall DQP configuration? From there, we conclude with a synthetic view of the resulting picture and discuss its theoretical implications and its range and limits.

### 3 DQP as a diverse and changing production concept

DQP originated as a designation for production systems in non-routine production, emphasizing quality, in large enterprises. The main business logic of such systems is the maximization of profit margins, rather than cost advantage and low selling prices. Under the impact of world economic changes following the collapse of the Bretton Woods order, DQP was the major industrial upgrading option in the European and North American national economies, as new competitors arose for mass production in newly industrializing countries. The ability to implement DQP rests on organizational and human resource policies and structures; while the implementation of DQP in an enterprise can be achieved in institutionally different ways, the wider spread of DQP across an economy depends on societal institutional patterns. On the other hand, this does not make DQP a homogeneous production concept; an emphasis on product and service quality can be achieved either through generic quality (durability, reliability) or through quality by customization. There is also an evolutionary change: industrial development is characterized not only by the spreading of similar practices but also by the differentiation of practices, such as between mass production industries and those industries making investment goods required by mass producers; in many ways, these constitute each other’s opposites.

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5 This could be imagined to occur much as in the classic novel by J.W. von Goethe: people who are related by more than kinship find each other and coalesce.

While Germany was presented as an exemplary case of DQP, it constitutes such a case in a particular way: non-routine and routine logics of production blend into one another in the same firm or industry, whereas in other economies they tend to be more distinct (by firms and industries). Industrial development has always had two sides. There have been alternating and conflicting waves, of intensified and of diversified use of production factors. Intensified use of human resources has been linked with the spread of “best practices” such as the segmentation of work systems, Taylorism and Fordism. But on the other hand, we have also seen countermovements to the spread of such practices. Mass production and continuous process production seemed to be the complete opposite. There has also been a sharp contrast between routinization of work and automation (in large batch and mass production) on the one hand, and non-routine work and enriched work roles (combined with the customization of products and services) on the other. Routinized – and in particular, automated – production and mass production require highly customized development and production of dedicated machines. Thus, mass production of automobiles has required transfer lines and other machining systems for parts production designed and manufactured to the specific requirements of users; their adaptation to a specific manufacturing purpose was the major foundation of their economy of use. Manufacturers of machine tools, particularly in settings where mass production became widespread, have production systems diametrically opposed to those of their clients. There is a crucial difference between the machine tool industry on the one hand and the wider machine building industry and firms on the other: Machine tool firms make machines that set tools to work on objects, to give them the shape required. Such machine tools are used by firms in many industries, machine building among them. The two industries may have opposite organizational and human resource characteristics, and they must not be confused.<sup>6</sup>

DQP theory and underlying studies would have suggested that in view of its institutional and cultural setting, Germany should have had DQP manufacturers in machine tools that were less routinized than the French firms in the industry, had more craft workers, and would have weathered the industrial crisis of the machine tool industry after the end of the 1970s precisely for the reason that they were more capable of non-routine manufacturing. This was the logic of our earlier thinking: the more you went DQP, the better you could withstand the shocks of the 1970s and evolve towards new products and services marked by customization. In fact, the German machine tool industry had been considered to be a hallmark of the opposite of Taylorist and Fordist work segmentation. However, upon closer investigation, the contrary applied on most counts: the French firms had more customized products and came into more serious difficulties during the crisis (Sorge/Maurice 1990). What had happened?

It was the demise of highly routinized and automated manufacturing during the industrial crisis in European and North American countries, in the industries that bought

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6 Even specialist researchers such as Herrigel (2015: 137) are guilty of spreading confusion about what the industries are.

machine tools, that led to a turn toward less dedicated but more flexible machines, using more flexibly programmable electronic controls. The Japanese machine tool manufacturers responded to this change more quickly and systematically, becoming world leaders in universal but flexible machine tools made in large batches. The German machine tool firms were less routinized, in an intermediate position between the Japanese and the French firms. They could hold their own in the crisis by being less DQP than the French firms; the latter, to a large extent, went bankrupt or ended up under Japanese corporate control. However, the differences in national institutional and cultural settings still turned out to be important: more embedded in networks of research and development with technical universities, more prone to inter-firm cooperation, with occupations in production engineering that had higher status and intertwined the sophisticated and the mundane aspects of such occupations, with bigger firms and more intensive experience in routinized production than the French competitors, they performed the switch to universal and flexible machine tools more systematically. There were bankruptcies in the industry in Germany, but also new firms that entered it.

Thus, more DQP was not necessarily better than less DQP, and in the industries supplying capital equipment to DQP manufacturers, the opposite was likely (see Sorge/Maurice 1990 for details). The point was that Germany, depending on the industry, also profited from being less DQP than firms in other countries. Nevertheless, the institutional argument about the importance of a supportive social ecology of firms still stood, as this embeddedness was one of the advantages of the German firms. It was related to the argument about markets: the German machine tool firms had more experience in the modularized manufacturing of universal rather than dedicated and highly customized machines. In addition, the greater institutional and cultural homogeneity in Germany – of occupations and work organization across branches of industry, with a greater similarity and affinity between the machine-making and the machine-using industries – was also helpful.

One can now see an important point emerge, modifying our earlier DQP concepts. German DQP was not a practice oblivious to economies of scale in batch production. The more general spread of DQP showed that it could not purely be conceived in opposition to large batch production. A sharper distinction than in Germany was found in other countries, and this hampered the progress of DQP rather than supporting it. The institutional isolation of DQP firms from mass producers – especially if industrial prestige and supporting institutions had previously gone to the mass producers – was apparently a central factor working against the spreading of DQP. In fact, it appears to be a concept distinctive for its internal variety and breadth, and the breadth implies that it has more variety with regard to routineness and batch production than we may have thought.

But not only the internal variety has to be re-appreciated; the link with the argument about performance does as well. In the more conventional theories of organization, “contingency theory” means that firms perform by achieving a “fit” between organiz-

ing and the task environment, such that, for example, a shift to more variable and less certain tasks – perhaps due to industrial restructuring and lack of demand for more mature products – goes together with a shift to DQP. While this was not entirely wrong, we had to admit that DQP was dynamically heterogeneous in the following way: German industry profited from a capacity to shift appreciably, from larger batches to small batches and vice versa, and to combine such distinct and even mutually contradictory logics on the basis of common institutions, notably in occupational education and training. The versatility in making changes – changing from one type of value creation competence to another and back – was crucial. In organization theory, this is referred to, in a more stylized form, as “ambidexterity,” – i.e. the ability to work with both hands equally well.<sup>7</sup> In organizing, this means the ability to combine, and to shift between, divergent production logics. In human resources, in a similar way, workers combine routinized activity with coping with unforeseen circumstances, practical experience with more abstract capacities, and manual work with a conceptual understanding.

In this form, the DQP argument still featured – even more so than we had expounded – the institutional corollaries of broadly dominant institutions explained above. Although institutions are eminently useful in a general way, and useful in particular ways depending on their precise characteristics, compliance with institutions is always beyond utilitarian motives. This has been our reasoning from the outset. The link between institutionalized and utilitarian behavior, being dialectical, makes a broad notion of DQP more dynamically heterogeneous than in some versions of “new” institutionalism, whereas “old” institutionalism has had a truly dialectical concept of institutions.<sup>8</sup> The latter is also present in historical institutionalism, such as in Hollingsworth’s treatment of American industrial capitalism and its institutional changes over time (1991). In the same way, it can be shown that a German mode of production has not always been identical with quality manufacturing. “Made in Germany” was an imprint enforced on German imports by the British government more than one hundred years ago, to indicate products of inferior quality; it only acquired a quality connotation gradually, over time. It did, however, rest on a body of human skills recruited among apprenticed artisanal craftsmen and featuring engineers and technical managers with production training and experience. German exports began with more routinized production of standardized goods, and the “quality” connotation became established earlier than the strategy of customization and non-routine manufacturing. Again, it was the ability to shift from one to the other and to combine them that was central, resting as it did on broad bases of occupational competence and occupational and career linkages between

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7 Ambidexterity denotes the ability to combine, or switch back and forth between, “exploration” and “exploitation” as two business strategies (J.G. March 1991) that are dialectically both opposed and linked. Ambidexterity is a “dynamic capability.” See O’Reilly and Tushman (2008).

8 In organization studies, old institutionalism stands for such authors as Selznick, who saw institutional sets as inherently conflictual, making for conformity but also creative deviation from standards, as a part of organizational dynamics. New institutionalism was represented by authors such as Powell and DiMaggio, who more single-mindedly looked at institutions as generative of “isomorphism.” See Selznick (1996).



the academic and the practical. DQP had thus originated from the Q end, and step by step shifted towards the D side. The most decisive step happened after the post-Bretton Woods industrial transformation had begun, with the deindustrialization of Europe and North America and the industrialization of developing countries.

DQP in Germany thus had to be re-conceptualized as more heterogeneous, emphasizing quality more than extreme customization, and as excelling at the combination of routinized with non-routinized operations and switching from one to the other. This was similar to the identification of other properties of German production systems: making “old” industries blend into and overlap with “new” industries, which also meant innovation by piecemeal conversion of technology in existing firms and branches of industry, rather than by industrial ruptures.<sup>9</sup>

#### 4 The politics of DQP

The DQP concept was originally invented to explain the exceptional condition of the German economy after the end of the Bretton Woods regime, which combined strong trade unions, limited managerial prerogatives, a right of labor to participate in management, high wages and a low wage spread with high industrial competitiveness on international markets. DQP was seen as the core of what was then perceived as the “German model,” described as a specifically productive use of *German* historical-institutional resources in manufacturing, driven in part *from below* by an institutionalized *labor constraint*.

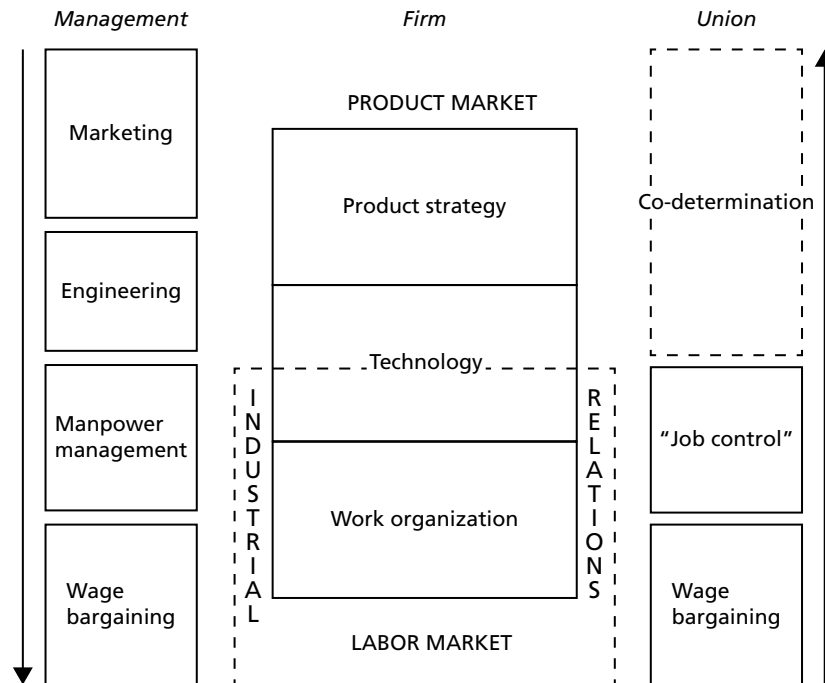
As indicated, DQP as a production concept partially reversed the commonly assumed line of causation from product market opportunities to product strategy and the organization of work to labor demand and supply (see Figure 2, taken from Sorge/Streeck 1988). In DQP, a particular, exogenously given labor supply both demands and makes possible a flat, flexible, skill-rich organization of work, which enables a kind of production that happens to fit niches for high value-added products in international markets (or even creates such niches by enabling the production of advanced goods and services that could not be produced otherwise). Constrained by labor market conditions shaped by well-established worker organizations, and encouraged and supported by favorable labor market opportunities, producers may favor – or feel forced to favor – a business strategy of industrial upgrading towards a “high road” industrial capitalism.

The *labor constraint* that we felt was giving rise to DQP consisted of employers being forced to use highly unionized and highly skilled labor, by industrial trade unions, and by works councils entitled to a strong voice in the organization of work and production.

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9 This was shown, for example, by Sorge, Campbell and Warner (1989).

Figure 2 Technology and industrial relations in context



Source: Sorge/Streeck (1988: 39).

Without the beneficial constraints, enterprises might have lost competitiveness, market share, and profitability. In other words, we did not regard DQP as liberal capitalism's default option. Instead, we considered it a non-liberal version of capitalism, defined by socially imposed limits to market pressures and a political capacity of workers (and governments) to shape managerial decisions, in order to safeguard non-capitalist interests in addition to and alongside capitalist interests. Our strong claim was that capitalist economies of this sort could be (at least) as competitive as liberal – i.e., unconstrained – capitalist economies.

DQP is conditional on a sufficient ("excess") supply of skilled manual labor (produced by a training system co-managed by industrial trade unions pursuing a relatively egalitarian wage policy; Streeck/Hilbert 1987), effective worker voice on work organization and employment, and strong global demand for DQP products (reinforced by attractive DQP supply). With hindsight, we realize that there were more parameters to the model which, however, we took to be largely constant at the time, leading us to underestimate their significance. One of these was that capitalists had to be captive – i.e., unable to escape being required for their own good to be more demanding on themselves.<sup>10</sup> In particular, DQP employers, in order to be educated as such, had to be dependent on

<sup>10</sup> On this see Streeck (2004).



the German labor market. This meant that the internationalization of their production systems (not their product markets!) had to be less than unlimited.<sup>11</sup>

Between the 1980s, when we developed the model, and today, a number of things happened that we did not anticipate, turning some of the constants in the model into variables. This altered the balance of power between capital and labor in Germany and thereby undermined some of the external favorable conditions on which the original version of DQP depended. Five such developments seem particularly important:

1. Since 1989, German employers can find highly skilled DQP workers in foreign countries, such as Eastern Europe and China, at much lower wages than in Germany. Labor market internationalization began to catch up with the internationalization of product markets, giving employers more choice as to where to produce. An essentially unlimited labor supply allowed employers to experiment with low-wage modes of production not previously possible in a country like Germany.
2. Employer mobility in borderless labor markets was enhanced by technological change. Production technology, including technology used for DQP, became more transplantable as the need for human intervention declined even in DQP settings.
3. Technological change further enabled the internationalization of production systems in that it can be used to control production processes across long distances and beyond national borders. There seems to be less need today for spatial proximity between conception and execution in production processes, making it possible to relocate more and more manual work to low-wage settings.
4. In the new plants abroad, unions are weaker than in Germany – often much weaker. This allows for experimentation with different, simpler production concepts. Process innovations in foreign plants – in particular in the U.S. and Japan – came to be used as models for domestic production, putting pressure on unions and works councils in Germany. Experimentation also took place in the new plants in the eastern part of Germany, where workers were both skilled and increasingly less unionized.<sup>12</sup> They were also disciplined by high regional unemployment and the threat of plants being closed by the *Treuhand* agency or new owners.

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11 Other hidden conditions included the fact that automation and robotization had to be of a kind that could still benefit from the intervention of skilled workers in the production process, making production dependent on a highly skilled workforce; a need for spatial proximity of conception and execution in manufacturing, making production immobile unless product design was moved as well; and foreign competitors lagging behind in learning the DQP tricks. For more on this see above.

12 The eastern part of Germany went from more or less complete unionization in 1989 to a rate below the western German average in a matter of about five years.

5. Increasing product market competition in sectors with global overcapacity weakens trade unions in Germany, as it makes cost-cutting a more important concern than in the heyday of DQP. Moreover, protection of employment in the face of a loss of market share or the relocation of production becomes more urgent in the eyes of workers today, making them more compliant and less willing to support their unions in conflicts. Wages and working hours come second behind job security, which more often than not came to be a condition for the core workforce to tolerate a two-tier wage and employment system, including a growing share of temporary workers in the workforce.

## 5 Adaptive processes in the twentieth century and beyond

Recent German developments must be seen in a longer-term historical context.<sup>13</sup> In Germany, DQP as an industrial mode of production and service developed, like modes of production, through the reciprocal adaptation and transformation of production systems, business logics, and socio-institutional conditions. In particular, DQP emerged and changed through four major constellations that exhibit period-specific reciprocal adaptations.

1. Beginning in the early 1880s, Germany became distinctive for a mode of production combining an emphasis on generic quality with routine industrial manufacturing, and also on a link between the science base and the more mundane aspects of manufacturing. With regard to human resources, there was, more than elsewhere, an abundant supply of apprenticed workers from the craft economy of small, owner-operated workshops which were often rural, as the major resource base of routine industrial production.<sup>14</sup>
2. After WWII, West Germany underwent massive industrialization and the broad emergence of large-scale production, as happened in many countries. But in Germany, particularly rapid growth and the power of unions in labor markets, underwritten by an industrial-level collective bargaining regime reinforced by workplace and enterprise-level co-determination, produced *beneficial constraints*. At the same time, *beneficial opportunities* were created by the introduction of further skilled worker occupations such as those of chemical process operator and steel mill worker, which did not take place in other countries. Similarly, the construction of occupational careers starting out from worker qualifications was particularly pervasive. Not only has Germany always had “more workers” in the workforce, but it has also linked worker and white collar careers and kept blue-collar worker occupations open to

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13 On the background, see Sorge (2005).

14 See Lee (1978) for an authoritative view.

more technically demanding “knowledge work” that in other countries would have become part of technician or engineer jobs.<sup>15</sup> This gave Germany a human resource and union organization homogeneity that was comparatively outstanding.

3. The beneficial constraints and opportunities characteristic of the West German economy supported the transformation of business logics, after the fall of Bretton Woods, towards non-routine manufacturing. Routine manufacturing functions and establishments were increasingly relocated abroad, especially after the upward revaluation of the German mark in 1969. This setting was the one in which we launched the DQP concept, combining as it did both aspects of quality, with a profit margin business logic and relative insensitivity to selling price, except where activities were relocated. The original DQP constellation came into its own as a result of the exhaustion of mass markets and mass manufacturing in the 1970s. German DQP firms were better able than their competitors to serve markets for more individualized, customized goods of high quality, produced in large numbers. In German automobile manufacturing, specialty producers like Mercedes and BMW could increase their production volume while volume producers like VW could learn to subdivide production volumes into smaller batches of more differentiated products, catching a premium price and switching a low-cost business strategy to one leading to higher profit margins.
4. The fourth period emerged in a liberalized European and world economy, after a critical transition following German unification (1990) and the inclusion of Eastern European countries very close to Germany. Gradually, the DQP of the third phase – which we had been dealing with – gave way to a new regime marked by the euro, a further opening of international goods and labor markets, and financialization. Internationalization of the labor market of German firms due to much increased possibilities for the relocation of production weakened the hold of German unions on the supply of labor to German producers. New technology lowered the dependence of producers on highly skilled labor, and international competition (not least by foreign firms that had learned some of the tricks of DQP) exposed German firms more than before to price pressures.

The fourth period broke in important respects with the DQP of beneficial constraints, as the maintenance of market shares by German firms increasingly relied on cost advantages (not only in unit labor cost but also in absolute cost). Furthermore, the movement towards non-routine production seems to have been arrested although the generic quality aspect of DQP remained. Business fell back on strategies implying volume

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15 Whereas most skilled electronic jobs would have become designated and treated as white-collar (technician or engineer) occupations requiring a college degree, many of them have remained blue-collar in Germany, requiring an apprenticeship; see Sorge et al. (1988). See also Sorge and Warner (1986). The same applies, for example, to workers in aeronautical construction and maintenance.

production and world market share, economies of scale and selling price. The major production concept changes attached to these were – e.g., in car manufacturing – platform standardization for different models, corporate “leaning,” and outsourcing to semi-independent suppliers. The latter two concepts also followed the shareholder value approach extolled by stock exchanges. In the later phase of the fourth period, after about 2005, it is significant how the German economy was again mentioned for having product quality market leaders in different branches of industry, both in large and small or medium-sized enterprises.<sup>16</sup> Again, after the collapse of the legitimacy of financialism, politicians and the media started singing the praises of *Mittelstand* companies, craft workers, caring for the product and the workforce, etc. This is a drastic change compared to the second half of the 1990s, when Germany came in for criticism as not being innovative anymore, following unification and its ensuing problems and parallel to the rise of financialism and shareholder value ideologies.<sup>17</sup>

It is noteworthy that the tendency to relocate production abroad in multinational enterprises increased far from monotonously where German firms are concerned. After about 2005, German multinationals started to take more production home than they relocated abroad. The main reasons were cost increases abroad that were higher than those in Germany, and defaults in public infrastructure and education and training in foreign locations.<sup>18</sup> As far as the organizational, human resources, and industrial relations aspects of “new” activities such as call centers are concerned, it is also striking that the contrast between Germany and the USA, for example, continued to be what it was already known to be, as Doellgast (2012) showed in great detail.

The fourth period was and is, therefore, ambiguous with regard to DQP. On the one hand, cost advantages became relatively more important to maintain the comparatively high level of German industrialization, notwithstanding the relocation of activities to new industrial countries or the European East. Beneficial constraints (in social insurance, general agreements on wages and working conditions, wage increases) were loosened for firms subject to international competition. DQP, where it survived in an altered form, became, as it were, voluntary and turned into a response to product market pressures alone, as distinguished from the labor market and labor politics pressures that were operative in Phase 3.<sup>19</sup>

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16 Bernd Venohr, a consultant and professor, claims that Germany has 1,000 world product quality leaders – from quality screws, to quality washing machines, to a range of investment goods – employing about 7 million people. Much as the reader may wonder why Lufthansa should be a world quality leader, it is true that Lufthansa Technik is a maintenance services leader, also active in the co-development of aeronautical equipment, and that the consulting arm of LH is the leader in aviation consulting, next to the International Air Transport Association. The account is therefore credible. See Venohr and Meyer (2007) and further publications in the business press.

17 A timely criticism of this interpretation of German decline, which had even penetrated down to otherwise sober industrial sociologists like Horst Kern, was provided by Harding and Paterson (2000).

18 This was demonstrated by Kinkel and Maloca (2009).

19 Along the way, German industrial relations and “social partnership” changed under the pres-

On the other hand, generic quality retained its importance, as did the non-routine aspect of manufacturing. Likewise, Germany strengthened its export performance precisely in those industries in which it had already gained a competitive advantage during the third period (investment goods sensitive to both customization and generic quality, luxury motor cars). Significantly, over time and despite the entry of new Japanese competitors reputed to be unbeatable in the 1980s, the dominant world market share of German luxury market car makers never shrank.<sup>20</sup> In a similar vein, Herrigel (2015) pointed out that although often relocating new subsidiaries abroad, German multinational enterprises stuck to a quality leadership strategy and tended to retain operations and functions in Germany that required higher technical sophistication. In this way, DQP Mark I, as it had emerged in the 1980s, turned into DQP Mark II, a modified market-driven mode of production rather than a labor-driven one, which emphasizes quality and diversity as a competitive advantage rather than as a constrained response to pressures from a politically powerful working class. Human resources for DQP are still available, even though the supply of apprentices is shrinking, due to more young people going to higher education and many school-leavers not being qualified for apprenticeship. Skilled intervention in production is still indispensable despite increased automation, but it implies the upgrading of skills in smaller direct production shares of workforces; this is also related to the employment of growing numbers of temporary and contract workers. DQP has ceased to underwrite stable and long-term employment at high wages; the causal arrow from product markets and product strategy “down” to human resource policy and the labor market has reasserted itself. It is no longer the politics of the labor market but the demands and opportunities of the product market that sustain DQP in its contemporary Mark II version. Much as the “push” of the product market had become more determining than the “pull” of the labor market and collective bargaining, DQP II still required the human resources and organizational policies to sustain it, although these had become decoupled from the beneficial constraints under DQP I.

## 6 Summary and conclusion

We originally posited DQP as consisting of two main components: the operations systems with their business logic on the one hand, and the wider institutional setting with its power distribution and interest politics on the other. Furthermore, we suggested that the components were complementary, meaning that they required each other for DQP to be possible and sustainable. We now know that our analysis was based on what could be observed during a specific period: the third period in our schematic account

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sures of internationalization; see, among others, Hassel (1999), Höpner (2003), Rehder (2013), Streeck and Hassel (2003), Streeck (2009).

20 See *The Economist*, June 7, 2014, 59–60.

of DQP development in Germany, which stretched from the mid-1970s up to the early 1990s. Placing DQP in historical perspective, we found that its institutional bedrock in labor markets and occupational training was prepared during what we have identified as a first period, changing over time while retaining central features. These included a propensity to blend training with education in broadly based skills and smooth the differences and transitions between manual and mental work, between worker, supervisory and engineering careers, and between traditional crafts and modern industrial jobs and occupations. Together with an increasing labor shortage during the post-WWII period, they helped sustain industrial unions and gave them a powerful position. This position, in turn – together with the inherited structure of the skill supply – supported the advance from the second to the third period, from mass production to DQP as a dominant if not generalized production pattern.

What was new in the 1980s was the relative pervasiveness and generality of DQP operations systems compared to both previous stages and other countries. German firms found it easier than firms elsewhere to move from routine to non-routine production and combine both. As pointed out above, by focusing almost exclusively on the non-routine elements of DQP (the “DQP Mark I” concept), we failed to see how central their interaction with equally present and important routine production capabilities was to it. Amending the original concept in this respect (replacing it with “DQP Mark II”) enables us to explain the changes that began in the 1990s and came to fruition in the first decade of the new century.

Moreover, the fourth period after German unification, at a time when the full impact of international liberalization was making itself felt, led to a decisive de-coupling of the complementarities suggested when trying to account for what we had originally seen. We learn from this, among other things, that complementarities should be reconsidered as a conceptual tool in political economy and socioeconomics. Much more so than we believed, they are tied to historical periods, making them truly “historical individuals.” While we used this concept in our initial article, we did not drive it to its logical consequence, which is that historical individuals have their time and are inevitably replaced by new, other individuals, whatever continuity may exist.

Decoupling of complementarities and interdependencies is often discussed, but the theoretical potential of the idea is not always fully grasped. In organization theory, Orton and Weick (1990) suggested that the decoupling of organizations was in fact a dialectical and evolutionary phenomenon, with two sides: as relations are loosened, the inevitable cross-referencing of action across domains of action leads to new interdependencies. By analogy, this may also apply to institutions. For example, trade union cooperation may remain stable or even increase precisely when their power is weakened and the welfare state and industrial collective bargaining are retrenched (Streeck 2016). Also, DQP operating systems may remain in place but begin to depend on stagnant wages and a stable currency, whereas they previously depended on and responded to rising wages and an appreciating currency. As DQP changes its form, so does its embeddedness in economic



and socio-institutional conditions. In a longer perspective, its “function” in counteracting economic decline in an old industrial economy remains the same, although the economic and political conditions change from one crisis to the next.

DQP Mark I ended with the decoupling of its main components; still, core operations systems characteristics did not vanish. Under technical, organizational, and market changes (internationalization!), non-routine production retained its place, as did the emphasis on generic product quality, although these were not driven further. Thus, when we speak of DQP Mark II, we mean changed but similar policies of diversification and quality, promoted more by self-interested enterprises rather than by institutionalized beneficial constraints, and following a business policy which more than in the past emphasizes competitiveness of the selling price. As in the third phase, today’s businesses draw on a historical heritage (the DQP Mark I mode of production) and use it as a resource out of which to develop new responses to changed circumstances.

Throughout this development, DQP *as a production concept*, even though it evolved, did not change fundamentally from what it was in the 1980s, although there have been new forms of organization. What did change was the economic setting, notably increasing unemployment after about 1993, which weakened the political and bargaining power of the unions and turned the beneficial constraints into enabling institutions to be adopted or not by management, at its discretion. Institutions still matter under DQP Mark II, but as enabling resources rather than constraining strictures. Also, just as there were limits to the de-emphasis of price competitiveness in favor of profit margins, there are limits to a neglect of labor and industrial relations standards. Despite the decoupling of historically specific complementarities, relations between DQP operations systems and collective interest representation and labor standards in the more established industries are likely to remain in existence, although they will be and are being modified in substance and practice (more pronounced dualism, a larger peripheral labor force at the expense of the core labor force, worker representatives facing production relocation if they refuse to cooperate, etc.). The most striking continuity with the past, including the first and second periods, is that German firms seem to have given more attention to the redesign of operations systems than firms in other countries, with the aim of maintaining industrial production in their country of origin. Nevertheless, it is difficult to predict how long DQP Mark II will last. The labor market in Germany has been changing from dominant unemployment to dominant skills shortages. Will this revive beneficial constraints? It is too early to tell if and in which way that might happen. Much will depend on evolving possibilities for relocating production abroad, and on technological costs and opportunities. How will business logics change in the way they affect different societies? Again, it is too early to tell.

Our present discussion may be seen against the background of capitalist development continuously producing conditions that imperil temporarily established modes of production while reducing the capacity of governments to maintain social cohesion by redistributive discretionary intervention (Streeck 2014). Within this long-term contex-

tual trend in OECD countries, Germany, after a problematic transition period from 1990 to 2005, has gained through its move from DQP I to DQP II, together with the competitive advantages it enjoys due to the euro, a more secure position than other European countries, even though it is impossible to say how long this will last. Our experience with the evolution of DQP, the concept and its reality, teaches us that the world is full of surprises, and much more complex than any image of it that we can make up.

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